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MFN 06-206  
Supplement 2

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**Subject: Response to Portion of NRC Request for Additional Information  
Letter No. 37 – Siting Issues, Hydrological Engineering – RAI  
Number 2.3-2 S02**

Enclosure 1 contains GEH's second supplemental response to the subject NRC RAI Supplement transmitted via Reference 1. Reference 2 provided the GEH response to the first supplemental RAI transmitted via Reference 3. Reference 4 provides the GEH response to the original RAI transmitted via Reference 5.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

*Bathy Sedney for*

James C. Kinsey  
Project Manager, ESBWR Licensing

*DOUG*  
MRO

Reference:

1. E-mail from NRC (Andrea Johnson) dated May 30, 2007.
2. MFN 06-206, Supplement 1, Letter from GE to U.S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Letter No. 37 Related to ESBWR Design Certification Application – Siting Issues, Hydrological Engineering – RAI Number 2.3-2 S01*, May 8, 2007.
3. E-mail from NRC (Andrea Johnson) dated April 2, 2007.
4. MFN 06-206, Letter from GE to U.S. Nuclear Regulatory Commission, *Response to Portion of NRC Request for Additional Information Letter No. 37 Related to ESBWR Design Certification Application – Siting Issues, Hydrological Engineering – RAI Numbers 2.1-1, 2.2-1 through 2.2-3, 2.3-1 through 2.3-6, 14.3-22, 15.3-1, 15.3-3, and 2.4-32*, July 31, 2006.
5. MFN 06-201, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 37 Related to the ESBWR Design Certification Application*, May 23, 2006.

Enclosure:

1. MFN 06-206, Supplement 2 – Response to Portion of NRC Request for Additional Information Letter No. 37 – RAI Number 2.3-2 S02.

cc:	AE Cabbage	USNRC (with enclosure)
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**Enclosure 1**

**MFN 06-206  
Supplement 2**

**Response to Portion of NRC RAI Letter No. 37  
Related to ESBWR Design Certification Application**

**Siting Issues, Hydrological Engineering**

**RAI Number 2.3-2 S02**

**Original Response previously submitted under MFN 06-206 and MFN 06-206 S01 without DCD updates is included to provide historical continuity during review.**

**NRC RAI 2.3-2:**

*In DCD Tier 2, Table 2.0-1, what is the basis for selection of the extreme winds used for design of safety-related structures? For example, are the speeds based upon historical fastest mile measurements or a percent exceedance over a certain period of time?*

**GE Response:**

The extreme wind speed of 62.6 m/s (140 mph) was selected to comply with expected requirements of southeastern coastal locations. This speed is approximately in the middle of wind speeds seen in a Category 4 hurricane. It exceeds the maximum wind speed value of 54.7 m/s based on a 100-year recurrence interval that was used for the design of safety-related structures in the ABWR design certification.

DCD Table 2.0-1 will be updated to clarify the basis for this value.

**DCD Impact:**

A markup of DCD Tier 2 Table 2.0-1 was provided in MFN 06-206.

*E-mail from Andrea Johnson dated April 2, 2007.*

**NRC RAI 2.3-2, S01:**

*Comments on response to RAI 2.3-2 (also related to RAI 14.3-22):*

*In reviewing the response to the RAI 2.3-2 dated July 31, 2006 contained in MFN 06-206 and the subsequent Revision 3 to the DCD, the staff notes the following regarding the basis for the selected extreme wind standard plant site design parameters:*

*The response to RAI 2.3-2 states that the DCD Revision 0 selected extreme wind speed value of 62.6 m/s (140 mph) is approximately in the middle of wind speeds seen in a Category 4 hurricane. Assuming the selected extreme wind speed value is a 3-second gust "basic wind speed value" as defined by SEI/ASCE 7-02, the selected extreme wind speed value represents a strong Category 2 hurricane rather than a moderate Category 4 hurricane. This is because the Saffir-Simpson Hurricane Scale is based on 1-minute average wind speeds whereas the value of the maximum 3-second gust in a hurricane environment is approximately 30 percent higher than the 1-minute average wind speed. Similarly, the higher DCD Revision 3 selected extreme wind speed value of 67.1 m/s (150 mph) represents a weak to moderate Category 3 hurricane.*

- *Contrary to what is stated in the response to RAI 2.3-2, the updated DCD Revision 3 Tier 2 Table 2.0-1 did not describe the basis for the selected extreme wind standard plant site design parameters.*
  - *It is unclear whether the 49.2 m/s (110 mph) extreme wind standard plant site design parameter for non-seismic structures is a 3-second gust wind speed.*

*Consequently, please provide the following:*

- (a) Revise DCD Tier 1 Table 5.1-1 and Tier 2 Table 2.0-1 to provide the basis for the selection of the extreme wind standard plant site design parameters for seismic category I and II structures as well as non-seismic standard plant structures.*
- (b) Clarify whether the 49.2 m/s (110 mph) extreme wind standard plant site design parameter for non-seismic plant structures is a 3-second gust wind speed.*

**GE Response:**

- (a) DCD Revision 3 is the result of multiplying the 62.6 m/s (140 mph) by the square root of the Importance Factor 1.15, which gives 67.1 m/s (150 mph) to account for the 100-year recurrence. It places it in the upper quartile of category 3 hurricanes in the Saffir-Simpson scale (Table 10.3 FEMA 361). Reference to the middle of category 4 in the previous response was a carry-over from the definition of the 1-minute average wind speed and is not correct. Note 13 will be added to DCD Tier 2 Table 2.0-1, to provide the basis for the selection of the extreme wind speed.
- (b) The 49.2 m/s (110 mph) extreme wind standard plant site design parameter for non-seismic plant structures is for 50-year occurrence and represents the fastest mile wind. This was selected based on Table 1.2-6, Volume III of the Utility Requirements Document (URD).

**DCD Impact**

A markup of DCD Tier 2 Table 2.0-1 was provided in MFN 06-206 S01.

*E-mail from Andrea Johnson dated May 30, 2007.*

**NRC RAI 2.3-2, S02:**

*The revised DCD Tier 2 Table 2.0-1 contained in Enclosure 1 to the GE Energy letter MFN 06-206, S01, dated May 8, 2007 lists the extreme wind site design parameter for seismic category I and II structures as a 100-year 3-sec gust wind speed of 150 mph. The same table lists the*

*extreme wind site design parameter for non-seismic standard plant structures as a fastest-mile-wind wind speed of 110 mph. Regarding the nonseismic standard plant structure extreme wind site parameter, please consider (1) expressing this site parameter in the same 3-sec gust wind speed units used to present the seismic category I and II structure extreme wind site parameter and (2) selecting a 50-year wind speed value that is consistent with the 100-year wind speed value chosen for the seismic category I and II structures (e.g., 140 mph).*

**GEH Response:**

- (1) & (2) The non-seismic standard plant structure 50-year fastest-mile wind speed of 49.2 m/s (110 mph) listed in DCD Tier 2 Revision 3 Table 2.0-1 will be changed to a 50-year 3-second gust wind speed of 58.1 m/s (130 mph).

**DCD Impact**

DCD Tier 2, Table 2.0-1, is to be revised as noted in the attached markup.

**Table 2.0-1  
Envelope of ESBWR Standard Plant Site Design Parameters <sup>(1)</sup>**

<b>Maximum Ground Water Level:</b>	0.61 m (2 ft) below plant grade
<b>Extreme Wind:</b>	<p><b>Seismic Category I and II Structures</b></p> <ul style="list-style-type: none"> <li>- 100-year Wind Speed (3-sec gust): <sup>(13)</sup> 67.1 m/s (150 mph)</li> <li>- Exposure Category: D</li> </ul> <p><b>Non-Seismic Standard Plant Structures</b></p> <ul style="list-style-type: none"> <li>- 50-year Wind Speed (3-sec gust): 58.1 m/s (130 mph)</li> </ul>
<b>Maximum Flood (or Tsunami) Level: <sup>(2)</sup></b>	0.3 m (1 ft) below plant grade
<b>Tornado:</b>	<ul style="list-style-type: none"> <li>- Maximum Tornado Wind Speed: <sup>(3)</sup> 147.5 m/s (330 mph)</li> <li>- Maximum Rotational Speed: 116.2 m/s (260 mph)</li> <li>- Translational Velocity: 31.3 m/s (70 mph)</li> <li>- Radius: 45.7 m (150 ft)</li> <li>- Maximum Pressure Differential: 16.6 kPa (2.4 psi)</li> <li>- Rate of Pressure Change: 11.7 kPa/s (1.7 psi/s)</li> <li>- Missile Spectra: <sup>(3)</sup> Spectra I of SRP 3.5.1.4, Rev 2 applied to full building height.</li> </ul>
<b>Precipitation (for Roof Design):</b>	<ul style="list-style-type: none"> <li>- Maximum Rainfall Rate: <sup>(4)</sup> 49.3 cm/hr (19.4 in/hr)</li> <li>- Maximum Short Term Rate: 15.7 cm (6.2 in) in 5 minutes</li> <li>- Maximum Roof Load: <sup>(5)</sup> 2873 Pa (60 lbf/ft<sup>2</sup>)</li> <li>- Maximum Ground Snow Load <sup>(5)</sup> (100-year recurrence interval): 2394 Pa (50 lbf/ft<sup>2</sup>)</li> <li>- Maximum 48-hr Winter Rainfall: <sup>(5)</sup> 91.4 cm (36 in)</li> </ul>
<b>Ambient Design Temperature: <sup>(6)</sup></b>	<p><b>2% Exceedance Values</b></p> <ul style="list-style-type: none"> <li>- Maximum: 35.6°C (96°F) dry bulb 26.1°C (79°F) wet bulb (coincident) 27.2°C (81°F) wet bulb (non-coincident)</li> <li>- Minimum: -23.3°C (-10°F)</li> </ul> <p><b>1% Exceedance Values</b></p> <ul style="list-style-type: none"> <li>- Maximum: 37.8°C (100°F) dry bulb 26.1°C (79°F) wet bulb (coincident) 27.8°C (82°F) wet bulb (non-coincident)</li> <li>- Minimum: -23.3°C (-10°F)</li> </ul> <p><b>0% Exceedance Values</b></p> <ul style="list-style-type: none"> <li>- Maximum: 47.2°C (117°F) dry bulb 26.7°C (80°F) wet bulb (coincident) 31.1°C (88°F) wet bulb (non-coincident)</li> <li>- Minimum: -40°C (-40°F)</li> </ul>
<b>Soil Properties:</b>	<ul style="list-style-type: none"> <li>- Minimum Static Bearing Capacity: <sup>(7)</sup> ≥ 718 kPa (15000 lbf/ft<sup>2</sup>)</li> <li>- Minimum Shear Wave Velocity: <sup>(8)</sup> 300 m/s (1000 ft/s)</li> <li>- Liquefaction Potential: None under footprint of Seismic Category I or II structures resulting from site-specific SSE.</li> </ul>